21819

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any THREE : **12**

(a) Draw P & ID symbol for

(i) Temperature transmitter

(ii) Orifice plate

(iii) Pneumatic signal

(iv) electrical signal.

(b) Explain the flow characteristic of control valve.

(c) List four communications methods in DCS. Explain Profibus in brief.

(d) Describe selective control scheme with example.

(B) Attempt any ONE : **6**

(a) Find the valve size in inches and centimeter for pumping the liquid flow rate of 600 gal/min with maximum pressure difference of 55 psi. Liquid specific gravity is 1.3.

(b) Draw and explain the working principle of distillations column.

2. Attempt any TWO : **16**

(a) Define valve positioner. State its types. Draw and explain pneumatic motion balance type valve positioner.

(b) Draw the block diagram of DCS in cement industry and describe its working.

(c) Draw P & ID for one element, two element and three element boiler control. Describe one element control.

3. Attempt any FOUR : **16**

(a) Compare feedback control scheme with feed forward control scheme. (4 points)

(b) Draw feed forward control scheme for heat exchanger and describe it in brief.

(c) Draw and explain the working of a lobe valve. (Single seated)

(d) State the role of instrumentation engineer in project engineering.

(e) Draw the block diagramof process control system. Explain each block.

4. (A) Attempt any THREE : **12**

(a) Describe the working of solenoid valve with diagram.

(b) State the principle of evaporator. Draw feed forward control scheme for single effect evaporator.

(c) Describe cascade control scheme with block diagram.

(d) Explain the selection criteria of DCS system. (four points)

(B) Attempt any ONE : **6**

(a) Enlist the documents required for instrumentation in project engineering. State the need of instrument index sheet and data sheet.

(b) Define cavitation and flashing. Describe the remedies to avoid them. (any two each).

5. Attempt any TWO : **16**

(a) Draw the architecture of DCS. Explain the function of each block in detail.

(b) (i) Explain the concept of co-current and counter current heat exchanger with diagram.

(ii) Draw the cascade control scheme of heat exchanger. Explain 'master' and 'slave' with respect to it.

(c) State the types of dryer. Draw the schematic of feedback and feed forward control scheme of dryer with label. Explain any one type in brief.

6. Attempt any FOUR : **16**

(a) Draw different inter connection P & ID symbols.

(b) Draw and label the butterfly valve. Describe its operation in brief.

P.T.O.

(c) List any four features of DCS.

(d) Compare human aided and automatic control system. (4 points)

(e) Enlist different process displays. Draw any two types.
